

**MESOPOROUS SILICA FILM FROM A SOLUTION CONTAINING A
SURFACTANT AND METHODS OF MAKING SAME**

ABSTRACT

5 The present invention is a mesoporous silica film having a low dielectric constant and method of making having the steps of combining a surfactant in a silica precursor solution, spin-coating a film from this solution mixture, forming a partially hydroxylated mesoporous film, and dehydroxylating the hydroxylated film to obtain the mesoporous film. It is advantageous that the small polyoxyethylene ether surfactants used in spin-
10 coated films as described in the present invention will result in fine pores smaller on average than about 20 nm. The resulting mesoporous film has a dielectric constant less than 3, which is stable in moist air with a specific humidity. The present invention provides a method for superior control of film thickness and thickness uniformity over a coated wafer, and films with low dielectric constant.